

WHAT IS CLAIMED IS:

1               1. An apparatus for removing a forming element from a concrete  
2 pipe, the apparatus comprising:

3                      a support member; and

4                      a removal device including first and second elements, the first  
5 element being attachable to the forming element and having a stop, the second  
6 element being supported by the support member such that the second element is  
7 swingable with respect to the support member, the second element further being  
8 engageable with the stop so as to apply a force to the first element for removing the  
9 forming element from the concrete pipe.

1               2. The apparatus of claim 1 wherein the first element is a guide  
2 element that is configured to guide movement of the second element.

1               3. The apparatus of claim 1 wherein the first element includes  
2 a channel that receives at least a portion of the second element.

1               4. The apparatus of claim 1 wherein the second element has an  
2 I-shaped cross-section.

1               5. The apparatus of claim 1 wherein the second element includes  
2 a cylindrical body that receives the first element.

1               6. The apparatus of claim 1 wherein the first element has a first  
2 generally rectangular cross-section, the second element has a second generally  
3 rectangular cross-section, and the first element extends through the second element.

1               7. The apparatus of claim 1 further comprising two cables  
2 connected between the support member and the second element for allowing the  
3 second element to swing with respect to the support member.

1               8.     The apparatus of claim 1 further comprising two chains  
2     connected between the support member and the second element for allowing the  
3     second element to swing with respect to the support member.

1               9.     The apparatus of claim 1 wherein the first element is  
2     supported by the support member.

1               10.    The apparatus of claim 9 wherein the support member  
2     includes a support frame and a trolley that is laterally movable with respect to the  
3     support frame, and wherein the first and second elements are supported by the  
4     trolley such that the first and second elements are laterally movable with respect to  
5     the support frame.

1               11.    The apparatus of claim 9 wherein the trolley includes a base  
2     and a support beam removably attached to the base such that the support beam may  
3     be adjusted laterally with respect to the base, and wherein the first and second  
4     elements are supported by the support beam.

1               12.    The apparatus of claim 1 further comprising a hoist supported  
2     by the support member and attachable to the forming element, the hoist being  
3     configured to control movement of the forming element after the forming element  
4     has been removed from the concrete pipe.

1               13.    The apparatus of claim 12 wherein the support member  
2     includes a support frame and a support arm pivotally connected to the support  
3     frame, wherein the hoist is movably attached to the support arm.

1               14.    An apparatus for removing a forming element from a concrete  
2     pipe, the apparatus comprising:

3                      a support member;  
4                      a guide element suspended from the support member and attachable  
5     to the forming element, the guide element having a guide channel and a stop  
6     disposed at a distal end of the guide channel; and

7                   a pendulum element having an I-shaped cross-section and being  
8 suspended from the support member such that the pendulum element is swingable  
9 with respect to the support member, the pendulum element being movable along at  
10 least a portion of the guide channel and being engageable with the stop so as to  
11 apply a force on the guide element, thereby causing the guide element to apply a  
12 removing force on the forming element.

1                 15. A method of removing a forming element from a concrete  
2 pipe, the method comprising:

3                   attaching a guide element to the forming element, the guide element  
4 having a stop; and

5                   swinging a pendulum element such that the pendulum element  
6 engages the stop and applies a force on the guide element, thereby causing the guide  
7 element to apply a removing force on the forming element.

1                 16. The method of claim 15 wherein the guide element has a guide  
2 channel that receives at least a portion of the pendulum element as the pendulum  
3 element swings.

1                 17. The method of claim 15 wherein the pendulum element has  
2 an I-shaped cross-section.

1                 18. The method of claim 15 wherein the pendulum element  
2 includes a cylindrical body, and the guide element extends through the cylindrical  
3 body.

1                 19. The method of claim 15 wherein the guide element and the  
2 pendulum element each have a generally rectangular cross-section, and the guide  
3 element extends through the pendulum element.

1                 20. The method of claim 15 wherein the pendulum element is  
2 supported by a support member such that the pendulum element is swingable with  
3 respect to the support member.

1               21. The method of claim 20 wherein the guide element is also  
2 supported by the support member.

1               22. The method of claim 15 further comprising adjusting swing  
2 weight of the pendulum element.

1               23. An apparatus for separating a first object from a second  
2 object, the apparatus comprising:

3               a support member; and  
4               a removal device including first and second elements, the first  
5 element being attachable to the first object and having a stop, the second element  
6 being supported by the support member such that the second element is swingable  
7 with respect to the support member, the second element further being engageable  
8 with the stop so as to apply a force to the first element for separating the first object  
9 from the second object.

1               24. The apparatus of claim 23 wherein the first element is a guide  
2 element that is configured to guide movement of the second element.

1               25. The apparatus of claim 23 wherein the first element includes  
2 a channel that receives at least a portion of the second element.

1               26. The apparatus of claim 23 wherein the second element has an  
2 I-shaped cross-section.

1               27. The apparatus of claim 23 wherein the second element  
2 includes a cylindrical body that receives the first element.

1               28. The apparatus of claim 23 wherein the first element has a first  
2 generally rectangular cross-section, the second element has a second generally  
3 rectangular cross-section, and the first element extends through the second element.

1               29. The apparatus of claim 23 further comprising two cables  
2 connected between the support member and the second element for allowing the  
3 second element to swing with respect to the support member.

1               30. The apparatus of claim 23 further comprising two chains  
2 connected between the support member and the second element for allowing the  
3 second element to swing with respect to the support member.

1               31. The apparatus of claim 23 wherein the first element is  
2 supported by the support member.

1               32. The apparatus of claim 31 wherein the support member  
2 includes a support frame and a trolley that is laterally movable with respect to the  
3 support frame, and wherein the first and second elements are supported by the  
4 trolley such that the first and second elements are laterally movable with respect to  
5 the support frame.

1               33. The apparatus of claim 31 wherein the trolley includes a base  
2 and a support beam removably attached to the base such that the support beam is  
3 laterally adjustable with respect to the base, and wherein the first and second  
4 elements are supported by the support beam.

1               34. The apparatus of claim 23 further comprising a hoist  
2 supported by the support member and attachable to the first object, the hoist being  
3 configured to control movement of the first object after the first object has been  
4 separated from the second object.

1               35. The apparatus of claim 34 wherein the support member  
2 includes a support frame and a support arm pivotally connected to the support  
3 frame, wherein the hoist is movably attached to the support arm.